

UNITED STATES PATENT APPLICATION

OF

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FOR

WATER SUPPLY ASSEMBLY OF WASHING MACHINE

[0001] This application claims the benefit of Korean Application(s) No. 10-2002-0075051 filed on November 28, 2002, which is/are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a washing machine, and more particularly, to a water supply assembly of a washing machine for preventing a hose, which connects a detergent box assembly to a water supply valve assembly, from being frozen to breakage

Discussion of the Related Art

[0003] Generally, a washing machine is an apparatus for eliminating dirt or filth attached to a laundry using reaction between water and detergent.

[0004] Such a washing machine is classified into a pulsator type, an agitator type, and a drum type. The agitator type washing machine rotates an agitator protruding from a bottom center of a tub in forward and reverse directions to perform washing. The pulsator type washing machine rotates a disc-type pulsator on a bottom of a tub in forward and reverse directions to perform washing using a frictional force between a generated current and a laundry. And, the drum type washing machine rotates a drum holding water, detergent, and laundry at low speed to perform washing. In this case, a plurality of tumbling ribs protrude from an inside of the tub.

[0005] The drum type washing machine is superior to other type washing machines in preventing damage and entanglement of laundry, thereby being widely used lately. FIG. 1 is a cross-sectional view of a general drum type washing machine. A construction of a general drum type washing machine is explained by referring to FIG. 1 as follows.

[0006] A tub 2 is provided in a cabinet 1 and a drum 3 is rotatably installed in the tub

2. And, a motor 4 is installed in rear of the tub 2 in the cabinet 1 to rotate the drum 3. A door 5 is provided on a front side of the cabinet 1, and a control panel 6 is provided over the door 5. A drain assembly 8 for discharging water in the tub 2 outside is provided under the tub 2. And, a water supply assembly 7 for supplying water and detergent to the tub 2 is provided over the tub 2.

[0007] Meanwhile, FIG. 2 is a perspective view of a washing machine having a top plate removed to show a water supply assembly in FIG. 1.

[0008] Referring to FIG. 2, a water supply assembly 7 consists of a water supply valve assembly 7a, a detergent box assembly 7b, and first and second hoses 7d and 7c.

[0009] The water supply valve assembly 7a is installed inside a rear wall of the cabinet 1, and the detergent box assembly 7b is provided inside a front wall of the cabinet 1. In this case, the detergent box assembly 7b consists of a housing 7f fixed to the cabinet 1 and a container 7g inserted/separated in/from the housing 7f.

[0010] Meanwhile, the first hose 7d penetrates into the cabinet 1 and is then connected to the water supply valve assembly 7a and the second hose 7c connects the detergent box assembly 7b and the water supply valve assembly 7a to each other.

[0011] In the above-constructed general washing machine, the water supply valve assembly 7a is provided as high as the detergent box assembly 7b, and the second hose 7c is installed to connect them to each other. Hence, even if the water supply valve assembly 7a cuts off water flowing from the first hose 7d, the water remains in the second hose 7c. Hence, a middle portion of the second hose 7c droops down and the remaining water gathers in the drooping portion. The water remaining in the second hose 7c becomes frozen at low temperature, whereby the second hose 7c is frozen to breakage.

[0012] Moreover, in the above-constructed general washing machine, water supply

valves constructing the water supply valve assembly 7a are screw-fixed to the rear wall of the cabinet 1. Hence, it is difficult to install the water supply valves at accurate positions. And, time is wasted for the corresponding work.

SUMMARY OF THE INVENTION

[0013] Accordingly, the present invention is directed to a water supply assembly of a washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0014] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a water supply assembly of a washing machine, which prevents a hose, which connects a detergent box assembly to a water supply valve assembly, from being frozen to breakage.

[0015] It is another object of the present invention to provide a water supply assembly of a washing machine, in which a water supply valve assembly easily installed.

[0016] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0017] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a water supply assembly of a washing machine including a detergent box assembly in a cabinet to communicate with a tub, a water supply valve assembly provided higher than the detergent

box assembly to control a passage of water flowing inside, and a hose provided slant to connect the detergent box assembly to the water supply valve assembly.

[0018] In another aspect of the present invention, there is provided a washing machine including a cabinet having an upper side covered with a top plate, a tub in the cabinet, a drum rotatably provided in the tub, a detergent box assembly in the cabinet to communicate with the tub, a water supply valve assembly provided higher than the detergent box assembly, the water supply valve connected to the detergent box assembly via hose provided slant, the water supply valve assembly controlling a passage of water flowing inside, a drain assembly in the cabinet to communicate with the tub and to discharge the water in the tub outside, and a control panel.

[0019] In the present invention, the detergent box assembly may be provided under a top plate of the washing machine and the water supply valve assembly may be provided over the top plate. And, the control panel may be provided on the top plate. In this case, the water supply valve assembly is provided in the control panel.

[0020] Meanwhile, the water supply valve assembly may include a holder on an upper surface of the top plate and a valve fixed to the holder to be connected to the hose. In this case, the valve is arranged slant to have one side connected to the hose lower than the other side.

[0021] The holder may includes a board having one face to which the valve is fixed and first and second flanges extending from a lower side of the board in both side directions, respectively to the mounted on the upper surface of the top plate. In this case, the board may include a slant face so that one side of the valve connected to the hose is mounted lower than the other side of the valve.

[0022] Meanwhile, the first flange may be fitted to the top plate and the second flange

may be screwed or bolted to the top plate. In this case, the top plate may include a bracket protruding upward for slip fit engagement of the first flange. And, the bracket is provided to enclose corners of the first flange.

[0023] In the present invention, the top plate may include a cut-away portion cut angled and a bracket having a portion neighboring to the cut-away portion protrude upward for slip fit engagement of the first flange.

[0024] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0026] FIG. 1 is a cross-sectional view of a general drum type washing machine;

[0027] FIG. 2 is a perspective view of a washing machine having a top plate removed to show a water supply assembly in FIG. 1;

[0028] FIG. 3 is a cross-sectional view of a drum type washing machine according to the present invention;

[0029] FIG. 4 is a perspective view of a washing machine having a control panel disassembled to show a water supply valve assembly in FIG. 3; and

[0030] FIG. 5 is a perspective view of a water supply valve assembly of a washing machine in FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0031] Reference will now be made in detail to the preferred embodiment(s) of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0032] FIG. 3 is a cross-sectional view of a drum type washing machine according to the present invention.

[0033] Referring to FIG. 3, a tub 25 is provided in a cabinet 10. The tub 25 is arranged to be suspended in the cabinet 10. For this, a plurality of elastic members, i.e., a spring 12 and a damper 13 as shown in FIG. 3, support the tub 25.

[0034] A drum 30 is rotatably provided in the tub 25. A plurality of tumbling ribs 31 protrude from an inner circumference of the drum 30 and a multitude of perforated holes 32 penetrate into an outer circumference of the drum 30, whereby water supplied in the tub 25 enables to communicate between the tub 25 and the drum 30 via the perforated holes 32.

[0035] An entrance 11 is provided at a front side of the cabinet 10 to put a laundry in/out of the drum 30. A door 15 is provided at the entrance 11 to open/close. A non-explained numeral '17' in FIG. 3 is a gasket provided between the entrance 11 and an opening of the tub 25. And, an open top of the cabinet 10 is covered with a top plate 20.

[0036] A motor 18 is installed in rear of the tub 25. A shaft of the motor 18, as shown in FIG. 3, penetrates into the tub 25 to be connected to the drum 30. Hence, once the motor 18 is driven, the drum 30 rotates in the tub 25. Meanwhile, the laundry is lifted up by the tumbling ribs 31 to fall down while the drum 30 rotates, by which frictional and shock energy is sufficiently attained for washing.

[0037] A drain assembly 40 and a water supply assembly are provided in the cabinet 10. The drain assembly 40 is for discharging water in the tub 25, and includes a bellows 42 connected to a drain 41 of the tub 25, a drain pump 43 connected to the bellows 42, and a drain hose 44 connected to the drain pump 43 to communicate with an outside.

5 **[0038]** The water supply assembly is for supplying water and detergent to the tub 25, and includes a detergent box assembly 70, a water valve assembly 60, and first and second hoses 81 and 82. FIG. 4 is a perspective view of a washing machine having a control panel disassembled to show a water supply valve assembly in FIG. 3. A water supply assembly is explained by referring to FIG. 3 and FIG. 4 as follows.

10 **[0039]** Referring to FIG. 3 and FIG. 4, a water supply valve assembly 60 is disposed higher than the detergent box assembly 70. The first hose 81 lies slant to connect the water supply valve assembly 60 to the detergent box assembly 70. The second hose 82 for supplying the water to the water supply valve assembly 60 is connected to the water supply valve assembly 60. Hence, if the water supply valve assembly 60 cuts off a passage of water
15 flowing in via the second hose 82, the water in the second hose 82 entirely comes into flowing in the detergent box assembly 70. This is because the water supply valve assembly 60 is disposed higher than the detergent box assembly 70 and because the first hose 81 is provided slant.

[0040] In the above-constructed washing machine according to the present invention,
20 both of the detergent box assembly 70 and the water supply valve assembly 60 can be provided in the cabinet 10. Yet, in such a case, a size of the cabinet 10 increases to give a big difference of installation height between the detergent box assembly 70 and the water supply valve assembly 60 as well as it is difficult to stably install the detergent box assembly 70 in the middle of an inside of the cabinet 10. Hence, required is a structure enabling to give a big

difference of installation height between the detergent box assembly 70 and the water supply valve assembly 60 and to stably install the detergent box assembly 70 and the water supply assembly 60.

[0041] Therefore, the detergent box assembly 70, as shown in FIG. 3 and FIG. 4, is installed under the top plate 20, whereas the water supply valve assembly 60 is installed over the top plate 20. For this, the water supply valve assembly 60 is installed over the top plate 20 should be covered with something. Hence, the present invention provides a structure that the control panel 50 controlling the washing machine is installed on the top plate 20 and that the water supply assembly 60 is installed inside the control panel 20.

[0042] Referring to FIG. 4, the control panel installed on the top plate 20 includes a front panel 51 and a rear panel 55. Various buttons are provided on a front side of the front panel 51 and various control parts are provided in the front panel 51. A rear side of the front panel 51 is open but is covered with the rear panel 55. And, in the rear panel 55, as shown in FIG. 4, a hole 55a penetrated by the second hose 82 is formed.

[0043] Moreover, in the control panel 50, the water supply valve assembly 60 is installed as well as the above parts. FIG. 5 is a perspective view of a water supply valve assembly of a washing machine in FIG. 3. The water supply valve assembly 60 is explained in detail by referring to FIG. 5.

[0044] Referring to FIG. 5, the water supply valve assembly 60 includes at least one or more water supply valves 61 and a holder 65.

[0045] The water supply valve 61 includes an outlet 61b connected to the first hose 81 and an inlet 65a connected to the second hose 82. Such a water supply valve 61 controls a flow passage of water flowing in via the second hose 82. The above-constructed water supply valve 61 is screwed or bolted to one side of the holder 65.

[0046] The first hose 81, as shown in FIG. 3, is provided slant. Hence, the inlet 61b of the water supply valve 61 connected to the first hose 81 is preferably provided higher than the outlet 61a connected to the second hose 82 to be slant.

[0047] The holder 65 is provided for installing the water supply valve 61 stably, and includes a board 65a and first and second flanges 65b and 65c. The inlet of the water supply valve 61 or opening 65d penetrated by the second hose 82 is provided at the board 65a. In order to provide the water supply valve 61 by slant, the board 65 having the water supply valve 61 thereon, as shown in FIG. 5, preferably has a slant surface.

[0048] The holder 65 is installed on an upper surface of the top plate 20, for which the first and second flanges 65b and 65c are used. The first and second flanges 65b and 65c, as shown in FIG. 5, extend outward from both lower side ends of the board 65a, respectively. The first flange 65b is fitted to the top plate 20, whereas the second flange 65c is screwed or bolted.

[0049] In order to fit the first flange 65b to the top plate 20, the washing machine according to the present invention is provided with a bracket 22. The bracket 22 protrudes upward from the top plate 20 for slip fit engagement of the first flange 65b. Of course, the bracket 22 may be separately prepared from the top plate 20 and then attached to the upper surface of the top plate 20. Yet, in order to save product cost and to simplify the process, the present invention provides a structure that the bracket 22 is built in one body of the top plate 20, which is briefly explained as follows.

[0050] A cut-away portion 23 that is cut angled is provided on the top plate 20. And, the bracket 22 is provided as a shape that a portion of the top plate 20 in the vicinity of the cut-away portion 23 protrudes upward. Such a structure can be easily implemented using a press after the cut-away portion 23 has been formed in preparing the top plate 20. Meanwhile,

a pair of the brackets 22, as shown in FIG. 5, are preferably provided to enclose each corner of the first flange 65b.

[0051] The above-constructed water supply valve assembly 60 is installed in a following manner. First of all, the water supply valve 61 is installed at the board 65a of the holder 65 using screw, bolt, or the like. The first flange 65b of the holder 65 having the water supply valve 61 installed thereon is fitted to the bracket 22 in FIG. 5, and the second flange 65c is then installed on the upper surface of the top plate 20 using screw, bolt, or the like.

[0052] The water supply assembly according to the present invention can be prepared in a convenient way to improve productivity since the holder 65 is installed on the top plate 20 after the water supply valve assembly 60 has been installed on the holder 65 with a wide space. Moreover, since the screw or bolt is fastened to fix after the first flange 65b has been fitted to the bracket 22, the water supply valve assembly 60 can be accurately installed.

[0053] And, the first hose 81 connects the detergent box assembly 70 provided under the top plate 20 to the water supply valve assembly 60 provided over the top plate 20 by slant. Hence, the first hose 81 should penetrate into the top plate 20. Hence, a perforated hole 21, as shown in FIG. 5, is provided at a portion of the top plate 20 in the vicinity of the water supply valve assembly 60.

[0054] Moreover, the detergent box assembly 70, as shown in FIG. 3, provided under the top plate 20 includes a container 71 and a cover 75. The container 71 is installed at a lower surface of the top plate 20 and is connected to the first hose 81. And, the container 71 is connected to an upper side of the tub 25 via bellows and the like. The cover 75 is provided to open/close an open upper side of the container 71. Meanwhile, the detergent box assembly 70 is not limited to the above-explained structure only but can also be constructed with the structure including the housing and container, as shown in FIG. 2.

[0055] Once the above-constructed washing machine according to the present invention is driven, the water supplied via the second hose 82 is supplied to the tub 25 via the water supply valve 61, first hose 81, and detergent box assembly 70. If the water supply valve 61 cuts off the passage after completion of the water supply, the water fails to flow in the first hose 81. In this case, since the water supply valve 61 is located higher than the detergent box assembly 70 and the first hose 81 is disposed slant, the water in the first hose 81 entirely comes into flowing in the detergent box assembly 70. Hence, the water fails to gather in the first hose 81. Therefore, the first hose 81 is not frozen to breakage despite cold weather.

[0056] Accordingly, the washing machine according to the present invention has the following advantages and effects.

[0057] First of all, the water supply valve 61 is located higher than the detergent box assembly 70 and the first hose 81 is disposed slant. Hence, the water fails to gather in the first hose after stopping the water supply. Therefore, the first hose is prevented from being frozen to breakage.

[0058] Secondly, the water supply valve assembly is installed in the control panel provided on the top plate. And, the water supply valve assembly includes the water supply valve and the holder. Therefore, there is no spatial limitation in assembling to provide easy work and to improve productivity.

[0059] Thirdly, when the water supply valve assembly is installed on the top plate, the holder is fixed using the screw or bolt after the first flange has been fitted to the bracket. Therefore, it is able to install the water supply valve assembly at an accurate position.

[0060] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and

variations, provided they come within the scope of the appended claims and their equivalents.